

Method and device for access communication/control

The present invention relates to a method and a device for access communication/control.

**5 Background of the invention**

Code locks, card readers, or such-to corresponding functions of a visiting preauthorized mobile telephone as disclosed in e.g. WO 00/62521, biometrical readers etc. all have a common disadvantage; in a varying degree they form a bar for occasional and welcome visitors/users (hereinafter "visitors"). This disadvantage is particularly obvious when visiting  
10 a tenant or similar in a locked building. Furthermore, the possibility for the visited party to make a "final" judgement/authentication based on from case to case varying situation may not exist. In order to overcome this disadvantage, in particular with regard to tenant buildings, so called entrance telephones, often combined with code locks, have been introduced, which basically can be divided into two groups: A - intercom systems and B -  
15 "entrance telephone systems" (e.g. SE 7308086-3). "Hybrids" therebetween also exist (e.g. US 5,046,083).

Group A has normally, particularly in larger installations, high complexity and considerable costs for hardware/installation, but involve no running costs as long as the system  
20 operates in intended fashion.

Group B has, despite simplicity and low initial costs, another major disadvantage, namely continuous running costs, i.e. a building having such an installation involves, apart from payment of a running basic subscriber fee, also pay for completed calls, which on one  
25 hand makes it expensive, and on the other is unfair for tenants having few visitors if the running costs are divided equally and charged on top of the rent paid by the tenants.

Various solutions aimed to minimize these problems have been proposed in e.g. SE 9901299-9 and WO 99/44353, each having features that might be of interest for more  
30 advanced installations/applications, but less suited for a conventional tenant building and other more common applications.

**Object of the invention**

One object of the present invention is to disclose a simple, low cost and easily installed  
35 entrance telephone solution, which does not involve high running costs, but offers good security, full speech/data communication between visitor and tenant or similar (or for example an automatic answering machine), hereinafter stated as "B-replier"; and exclusive

possibility for the called party to reply to the call, and thereafter, by own choice, perform the control function (e.g. open the entrance lock), i.e. all substantial and characteristic features of entrance telephones etc., and which advantageously can be combined with a special code lock, but also card/biometrical reader etc. (and TV camera, one or more direct  
5 intercom line, keypad, IR/RF-reader/transponder, speech(audio)parts and so on). Moreover, instead of a tenant for door opening, a visitor before e.g. a machine for performing some requested service can in another preferred embodiment of the present invention, be offered possibility to likewise contact a service provider, man or machine, acting as B-replier, which in its turn likewise can call up the machine in question and so  
10 preform a caller-ID-authorized service function, i.e. provide access, where access can include opening as well as access to services and goods.

Another object of the invention is to facilitate two-way communication between a service provider, man or machine, and a machine performing requested services, whereby a  
15 user's mobile telephone is used for establishing communication with a service provider, and as a following step, while the call is maintained, the mobile telephone is placed into a "cradle" having a microphone and a loudspeaker connected to a service providing machine, or other contrivance for short range communication with a mobile phone, e.g. IR, Bluetooth, and which so is passed on by the mobile (hereinafter commonly referred to as  
20 "cradle"), thereby establishing a two-way signal or data transfer link between the service provider and the service providing machine. On completion of accepted transmission, the service providing machine is actuated to perform requested service. While in one preferred embodiment hereof which for the rest maintains a to be herein disclosed conventional telephone network connection/usage, and the thus established data link primarily is used  
25 to enhance and speed up a transaction, this also makes another to be herein disclosed preferred embodiment feasible, where no own permanent connection to a signal transferring network is required for the service providing machine but by means of mentioned (and consenting) mobile telephone's regular subscription a virtual telephone network connection is instead established.

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### **Description of preferred embodiments**

Since the present invention should be able to handle numerical codes, such as telephone numbers, it will be described with reference to a preferred embodiment which is integrated with a conventional code lock, i.e. with a visitor accessible key pad which in a conventional  
35 way will be seen by a visitor approaching the entrance (apart from perhaps instructions, a board with names of tenants etc. for this particular type of (entrance) application); and since also card and biometrical readers as output deliver numerical codes, they are easily

connected, and not described further hereafter. A lock is normally connected for entrance applications; for other applications other control means as required.

In difference to the disclosure made in SE 9901299-9. the present invention does not  
5 require any response to any type of direct signalling from an (adjacent) mobile telephone. No control is thus made e.g. of number input performed by a visitor. However, it offers by its signal response capacity a visitor the possibility (which always exists, but without this capacity) to call by his own (mobile) telephone an authorized replying party, the B-replier, whereafter same handles validation, active control signalling etc.. A device according to  
10 the present invention has namely in one preferred embodiment its own permanent connection (subscription and thereby allocated telephone number/address, hereinafter commonly referred to as "telephone number") to a regular, operator administered telecommunication's network (hereinafter commonly referred to as "telephone network"), fixed or mobile, also e.g. "IP-phony", Internet, LAN, MiniCall (pager) etc., which in a  
15 conventional way offers the service "number ID" (Caller-ID). A device according to the present invention should further accept calls and the "ID" information and decode and treat same. However, it is not necessary, for the actual functionality, that the device according to the invention uses its telephone network connection for outgoing calls (as with regard to the aforementioned Group B); typically can the device according to the invention not dial  
20 telephone numbers - only reply to incoming calls - which does not rule out that the network connection can be used by e.g. caretakers, alarm diallers, etc. to access the telephone network, but then typically not in connection with the entrance telephone, other than when a combination system is implemented. A combination with alarms (preferably having priority) is advantageous, since the degree of use for the telephone network connection  
25 is increased and responsive control signals etc. can be sent back to alarm site.

This embodiment offers thus the visitor (or rather the tenants) direct code lock services, but on top of that complete entrance telephone services with use of the visitor's own (mobile) telephone, on which the visitor initially dials the telephone number of the tenant  
30 or similar. This can be made at a distance (in which case also by a fixed network connected telephone) or (most often) by the "entrance" (in which case depression of a key on the device according to the invention - even though not necessary - may start up the procedure and thus confirm proximity of the visitor). Should the number dialled be a number allocated to the device according to the invention, the device may via the number  
35 ID check the authority of the "visitor" for any possible direct function/signal response obtainable via the device according to the invention, which may, particularly over a distance, be a desirable feature for the invention, perhaps in particular for applications

involving apparatus/programming etc..

Should the number dialled relate to the telephone of a tenant or other service/access provider (fixed or mobile, and which should not have the service "protected number" 5 activated in order to operate according to the invention), this party, the B-replier, can answer and per conversation etc. establish that it is an "entrance call". If a lock opening function or other function by the device according to the invention is desired, the B-replier now activates a 3-party conference call (or ends the entrance call; after possibly having instructed the visitor how to proceed; if audiopart, same can then "take over" the 10 conversation; a visitor can also have used other means than a telephone - or other telecommunication's instrument like e.g. "IP-phone"; PC etc., hereinafter commonly referred to as "telephone" - call to a B-replier's corresponding telecom instrument, e.g. SMS; shouting; fixed time appointment, for indicating presence and wish for access) and dials the number to the device according to the invention. Via its number ID a check is 15 performed on the telephone number of the B-replier against a list of programmed numbers in order establish the authority of the B-replier and what response same is authorized, e.g. time zone, control means, action etc.. When the authority has been established (for example, a "tenant of the building"), the device will listen for control signals (and also send back its own control/status data etc.) via existing connection (for example DTM for 20 entrance telephone systems; and more advanced duplex modem data signalling for apparatus applications), and act accordingly. Since the visitor in this situation is disconnected, the above signalling takes place exclusively between authorized B-replier and the device according to the invention. When the device according to the invention has accomplished required action, and possibly also confirmed this, the call is disconnected. 25

When looking at the costs, the result is: Simple technology and installation results in low costs. Connection (subscription) is the only common cost for the building and may also be favourably negotiated with one of the many today existing operators (since additional income due to call fees for calls via its network might be involved, particularly in connection 30 with any 020 applications = free or sponsored call number). In e.g. houses with more than one entrance door, one central unit having the sole telephone network connection, can "serve" multiple doors.

The visitor pays for his call via his telephone bill, unless the invention (probably most often 35 in apparatus/machine applications) offers 020-numbers to preprogrammed B-replier(s), credited when transaction is performed.

The B-replier accepts the cost for its own calls to the device according to the invention, and in difference to the aforementioned Group B there is no cost for a refused opening operation, since no call to the device according to the invention is necessary.

- 5 Should a tenant be preprogrammed as a B-replier via a mobile telephone (telephones connected to a fixed network are not relevant) and brings same when leaving the building, entrance lock opening can be performed without regard to geographical position and also when no visitor has made a call, i.e. such a mobile telephone can open the entrance lock for the tenant if a call is made to the device according to the invention and if subsequently
- 10 an opening command is made. On the other hand, this could involve a call charge (opening code via a keypad is free of charge), but it offers an alternative when no keypad exists or same is disconnected (time zone operated).

In addition to the above described embodiment of a preferred embodiment can be

15 mentioned: Even though a keypad etc. accessible to visitors is not required for the entrance call function - a basic installation would actually only need to state its presence by means of an instruction, pushbutton etc., as previously described, addition of a keypad has many advantages, apart from the practical operation of a code lock in general. Thus a keypad can be used for so called alarm shunt; in situ programming (where there is no

20 modem, or using PC/laptop therefore, which otherwise is preferable, for some reason not is done); control/opening possibility for not "entryphone-programmed" tenants etc..

When used for apparatus applications, e.g. automatic machines, a keypad can also be used for extended communication between visitor and B-replier in a device according to

25 the invention, for example card PIN-codes etc.

The opening function command can be further protected if the B-replier, after having established connection with the device according to the invention, e.g. by means of a special prefix or SMS (and initially authenticated by the caller-ID), activates the device to

30 receive an improvised temporary single use code, which within a certain period of time must be repeated from the keypad connected to the device according to the invention in order to be an accepted command, and which thereafter is no longer valid. The visitor is in this case reconnected into the call and advised to dial this code on the keypad of the device, which acts on the command, the proximity of the visitor also being made certain.

35 In an analogous manner also expected visitors (without mobile phone) can in advance be given a code which is programmed in to be valid once (at e.g. a party, serveral) at a given time interval, as well as an essentially immediate one-time-code can be given if e.g.

someone impromptu calls from a nearby pay phone. Fixed codes may thus (with individual time zone validity) be reserved only for certain authorized people, service staff, etc., whereby the risk for codes becoming known is reduced. All transactions (also entrance calls) will be "numerically linked" and may thus be saved to track improper use, if required.

- 5 Sometimes the mere storing/saving of the number of a calling party, e.g. a not preauthorized mobile phone, could be sufficient criterion for allowing at least partial access, e.g. permit to buy petrol at cash petrol pumps without first going in to the counter and pay in advance.
- 10 Should a B-replier use call forwarding for his telephone and still wish to maintain opening capability, the device according to the invention may after a call from the preprogrammed (authorized) telephone and a suitable prefix, master code, SMS or similar be updated with relevant number, active time period, etc.. Also other real time programming of the device according to the invention can be made by a telephone call (and also via modem etc.) in
- 15 a similar way.

Another added feature according to the present invention for more advanced, speedy and enhanced use than what is possible by just by pushbutton operation etc. on a mobile phone or apparatus keypad can be a "cradle" (or other short range communication unit)

20 into which the visitor can place his mobile telephone on request from the B-replier and after having completed initial communication with same. This "cradle", similar to the old 1970's telephone modems has a microphone and loudspeaker and can thus in such a situation transmit/receive rather advanced data communication between a device according to the invention and B-replier via the visiting mobile, (as complement or alternative) provide for

25 the earlier mentioned initial and also here with reciprocity possible "ID-check", and thus facilitate rather complicated transactions as services to the visitor, for example, issuing tickets, cash machines, payment machines for parking, automatic machines for supply of goods etc., and may be suitable for more elaborate applications, probably not for pure man-to-man-communication, such as entrance telephone installations.

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Since an own permanent connection to a telephone network for a device according to the invention has not been mentioned in the above situation, it should be recognized that same actually does not need to exist. It can have it or not have it. It can in the latter case instead (via the cradle and visitor mobile) occasionally "take over" the visitor's subscription and

35 thus virtually be telephone network connected per each transaction. If it has its own permanent telephone network connection and given telephone number, which however is more expensive both by its then construction and connection, it can then be called by the

B-replier as above earlier described, the B-replier's authority being cleared by the caller-ID, and the cradle link merely used for complementing same and/or enhancing etc. the transaction. If it doesn't have these own permanent features, all authority ID-data can be fully included in the transaction signal/data cradle link connection and communication. A

5 user with a mobile telephone calls a number stated by the installation which includes the "cradle" and receives contact with a machine/person requesting information of the user's desired purchase, credit card number and similar. When communicating with a machine, choice and input of information can be made via the keypad of the mobile telephone. When required information relating to the transaction has been inputted/accepted, the user

10 receives a request to place the mobile telephone in the "cradle" (not disconnected) and to, for example, depress a button adjacent to the "cradle". Hereby the local unit installation is "lended" the visitor's subscription and call, and becomes thus telephone network connected/linked (per 020-number the "loan" can be repaid, and can the couple thus with fair business ethics also be used for apparatus update/programming etc. in real time, and

15 if speech audio part, also conversation can be by command upheld). Hereafter communication takes place between the local unit and called unit according to a predetermined signalling protocol, preferably by a signal modem. In order to ensure required security, the communication can be coded, including a coded check sum, or authenticated in other known way. When communication has been completed, the user may, for example,

20 receive a message from the local unit to remove the mobile telephone from the "cradle" and to terminate the call. Hereafter can the local unit print a ticket or other type of verification or service for intended purpose. This might be suitable in cases when, for example, an own permanent connection to a telephone network is difficult or the application does not motivate the extra cost and administration involved for an own

25 permanent connection to a telephone network.

As example of a related embodiment can, for example, be mentioned the possibility to use units not connected to a telephone network in connection with holiday cabins, hotels and similar, whereby a user can establish connection to an administrative centre via the mobile

30 telephone, and request to rent a cabin, room or similar. After acceptance of the transaction, which may include transfer of e.g. credit card information from a user, the mobile telephone is placed in the aforementioned "cradle", whereafter required information for permitting access is transferred. The local unit may now as an alternative for example perform lock opening, but same may also be equipped to manufacture a "key" to the

35 rented object, which for example can be a printout of a bar code, a card with an information carrying magnetic strip, or a punched key card. Such a key may obviously also include information relating to the length of the rented period, and when said period expires be

blocked against further use. Such an embodiment means that the local unit does not require any own permanent fixed or mobile telephone network connection, since communication between administrative central unit and local unit is carried out utilizing the mobile telephone of a user. Similar applications may involve issuance of tickets and other documents, delivery of goods from vending machines, etc., based on information transferred from an administrative centre to the machine having the above mentioned "cradle".

Should the invention be used for a building having its own local exchange, it may be arranged in such a fashion that all extensions can open free of charge during office hours and (typically in night mode and with relevant preprogrammed home numbers) also from home, which would however normally involve a call charge for opening.

With regard to buildings having only single or a few tenants, the costs involved for a separate telephone network subscription would be a disadvantage. However, with an ISDN subscription, one of the channels can be used without any additional cost. Furthermore, mobile and fixed telephone network subscriptions (refill or invoiced) are today offered with two telephone numbers, whereby one can be used to check the number ID from the other. WLAN-telephones are also more frequently used, and involve often a PABX function, which makes it possible to connect a further individual identity (number). Should one of these extensions be used by the device according to the invention, access can be controlled by the other. More contrived, a device according to the invention can be put and configured to constantly monitor a house's sole (fixed) telephone line, and per a DTMF-receiver detect all the numbers dialled by the house telephone(s). When a such number (after line tone) is the same as that of the house, it can (by the dialled number-ID) start listen for the busy tone that now will commence (this to exclude numbers dialled by external parties in call), and at the right "mix" (line tone+number+busy tone) allow access. More hypothetically, perhaps the "off hook" caller-ID variant (which give the ID of a calling party even when a call is on, it is also called "call-waiting" ID, and is presently implemented in a few countries) could be used, meaning that caller-ID could be given also when calling one self, so to say. Much depends here on how the actual network operator now and henceforth shapes and provides it's caller-ID service (at present there is no common "global" standard), as also how future telecommunication's systems may be configured; and it could thus be here appropriate to generally state that the thought/scope of the present invention is felt to be valid evenso, as also should certain elements/features of this invention be placed centrally (in CO/base station/server/etc.) by the operator.



It is also possible to avoid call charges for a request to open the entrance lock. When the B-replier has talked to a visitor and wishes to allow access, a call to the device according to the invention would indicate the number ID (Caller-ID) to the call receiving device, which could be set to only answer incoming calls after a certain number of ring signals, e.g. five.

5 Should the B-replier terminate the call earlier, e.g. after two ring signals, such an action could be interpreted as a direct command to unlock the entrance door. Since the called device receives the number of the calling party without answering the call, the ID can be checked and approved as an authorized B-replier, and the short call period (2 ring signals) in combination with received ID would be a command to open the entrance door lock. No

10 call charge would be involved.

On the other hand, should the B-replier allow (in this example) five ring signals, the called device will answer the call, and the B-replier would now be able to perform service requests by inputting predetermined code sequences per DTMF. This means that normally

15 a call charge is involved, whereas simple lock opening commands (as described above) would be free of charge. A B-replier can (by programming) individually define whether its number immediately should lead to direct access or service requests/signalling, and shifts therebetween can also be time-zoned. This could be advantageous for e.g. tenants and nighttime. If the called device (in e.g. apartment buildings) have two incoming lines

20 (numbers), one number called could provide direct access free of cost, while the other number could be put to take its call (at a cost) and so (after ID-check) allow more advanced control signalling, programming etc.. Two (or more) incoming lines (numbers) obviously also generally would increase the over-all capacity of larger installations. One can also here mention that if the "off hook" caller-ID service is available with installations

25 where one central called device unit (having only one incoming line) is to handle several access points, direct access could be given to one point (by the "off hook"-ID), even when the central unit is busy on the telephone line with a more elaborate and time consuming access signalling for another. If only direct access is on, though, handling times are so short that conflicts are unlikely, and so "off hook" caller-ID would not be very vital; and

30 concurring code/card/etc. access can of course also be handled.

With regard to entrance telephone systems, and other existing systems for control and access, such as for instance intercoms (group A), code/card/biometrical readers, the method according to the present invention can in most cases be implemented with major

35 parts of previous installation unchanged. It is also possible to modify such earlier installations in such a way that previous system is maintained in parallel with the method according to the invention. As a result, for example, certain tenants may prefer to use the

cost effective method according to the present invention, whereas other tenants may prefer to use existing system, e.g. with entrance calls being switched through via the public telephone network to their ordinary telephone.

- 5 Whereas thus preexisting access control systems can be upgraded to include the present invention by attaching an according to the invention relevantly programmed and organized common caller-ID device, a separate advantageous embodiment of the present invention, primarily useful for apartment buildings, gated communities etc., is realized, which is already when manufactured built to combine "classical" telephone entry with the present
- 10 invention's essentially as hereinabove disclosed caller-ID concept, into one integrated system. It will need just one telephone line and number for performing "both ways", and since it for the classical dial-up modality needs both microphone and speaker and also a keypad, same can be used also for maintaining conversation in a caller-ID version communication (by preprogram or letting e.g. five signals go and then by DTMF command
- 15 activate the speech), and for code lock use. Each B-replier's choice of modality and available features can be individually assigned per programming, and also time zoning hereof is possible. Normally, then, dial-up by the system to B-repliers having chosen caller-ID modality, is not allowed. Since however the system would have a telephone number, that same easily recognisable number will appear for a called B-replier having a caller-ID
- 20 (even busy in a call, if off hook ID). This can be separately used (most likely quite infrequent, and programmable, and for just B-repliers having chosen their telephone numbers to be thus accessible; but mentioned here just as a technical possibility within the inventive thought) to giving visitors a possibility to call such B-repliers by the system, free of cost. When such a B-replier number is thus called, it can ring very shortly and then
- 25 break, i.e. before reply and thus cost. But the B-replier is now by the caller-ID intimated of the call, and can in its turn call up the system, either direct give access, or entering into speech/signalling phase.

- Alarm systems (to-day almost all telephone linked), especially surveillance systems type
- 30 fire, medical/elderly care etc., have so far had problems with legitimate access (entry) for personnel at call to actual alarming site, if locked. At e.g. fire brigade call, must often a special unit bringing a great number of coded keys, whereof one is supposed to open the door, arrive, so that the entranced door should not have to be forced by fire axes etc.. This is a both administrative and cost problem and with uncertain synchronization. By
- 35 integrating, or complementing with, a device according to the present invention into an alarm system, a solution hereto would with good congruence and security be given, by synergic call-up from an area-wise inprogrammed operative center, and thus can opening

be effectuated at received authorized ID. This also has the advantage over distributed (e.g. per local personnel's probably diverse numbers) authentication, that only a few numbers which furthermore always can be expected to be at hand, here need to be inprogrammed for the whole area, town etc.. Above described integration/complementing can be done at  
5 manufacture or as a retro-fit.

The present invention is thus not restricted only to applications relating to entrance telephone applications and similar, since the principles disclosed for access control to a building also can be used for various types of safe transactions with use of a mobile  
10 telephone, and with a device according to the invention communicating with a fixed telephone network, a mobile telephone network, as well as without any own network connection (cf. the example of a key delivering machine described earlier).